DOCUMENT RESUME

ED 193 191 SP 016 760

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TITLE Back to Basics. New Horizons in Nutrition.
INSTITUTION Luzerne Intermediate Unit 18, Kingston, Pa.
SPONS AGENCY Pennsylvania State Dept. of Education, Harrisburg. Bureau of Curriculum Services.
PUB DATE 80
NOTE 19p.: For related documents, see SP 016 752-761.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Dietetics: *Eating Habits: Health Education: *Human Body: *Nutrition Instruction: Physical Fitness: *Physical Health: Secondary Education: Self Care Skills
IDENTIFIERS *Vitamins

ABSTRACT

This instructional handbook is one of a series of ten packets designed to form a comprehensive course in nutrition for secondary students. This unit discusses the basic concept in nutrition education that if one eats a varied, well-balanced diet it is likely that one's nutritional needs will be met. Information on the fat soluble vitamins is presented. It contains a page of teaching suggestions, a pre-test for the students, and factual nutrition information with examples of how this information can be used in daily living. A post-test and bibliography are included. (JD)

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NEW HORIZONS IN NUTRITION

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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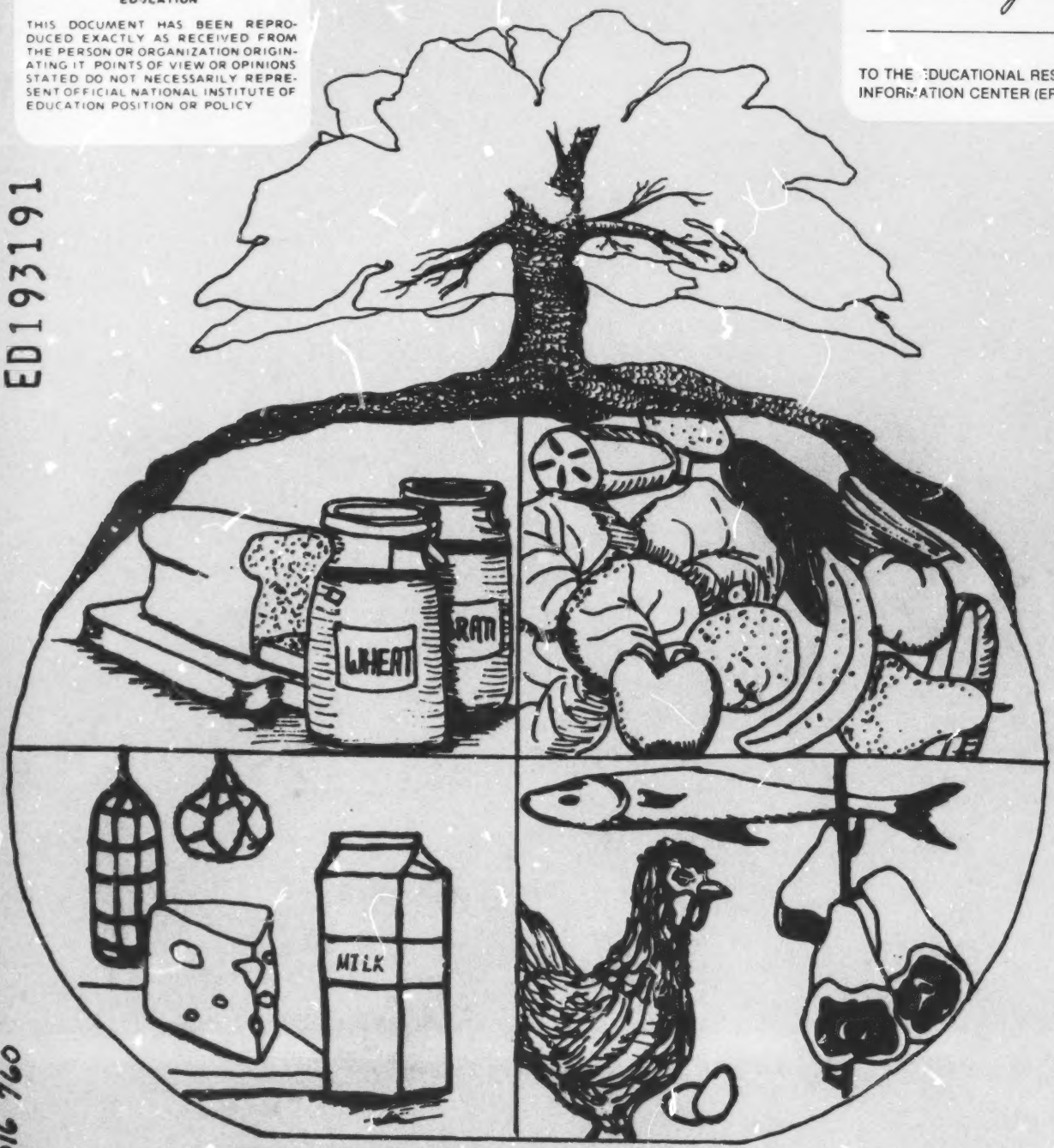

BACK TO BASICS

SP 016 760

NEW HORIZONS IN NUTRITION

AN ISSUE ORIENTED APPROACH

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DEVELOPED THROUGH A NUTRITION EDUCATION AND TRAINING GRANT FROM THE PENNSYLVANIA DEPARTMENT OF EDUCATION TO

LUZERNE INTERMEDIATE UNIT 18
368 Tioga Avenue
Kingston, Pennsylvania 18704

Summer, 1980

ACKNOWLEDGMENTS

The project staff wishes to express their sincere appreciation to the following teachers who assisted with the field testing of these instructional packets.

GREATER NANTICOKE AREA SCHOOL DISTRICT
LOUISE HUDAK
JOHN KASHATUS
THEODORE WIATEROWSKI

HANOVER AREA SCHOOL DISTRICT
MARIE DRUFFNER
ROSEMARY KOCHER
MARY ANN MACIUN
MARY SUE MITKE

HAZLETON AREA SCHOOL DISTRICT
ELIZABETH ABERNATHY
ANNE CONNOR
ROBERT R. WILLIAMS

LAKE LEHMAN SCHOOL DISTRICT
LYNN EVANS
JERI JONES
EMMA MATZ

WILKES-BARRE AREA SCHOOL DISTRICT
FIORA SHRADER

WYOMING VALLEY WEST SCHOOL DISTRICT
ESTELLE FREEDMAN
MIRIAM HANNON
MARGE KELLY
REGINA TIRPAK
DOLORES WEISS

PROGRAM INTRODUCTION

These ten instructional packets are designed to help you make the science of nutrition a fascinating, relevant topic of study for your students. The study of nutrition is the most basic of all skills as eating is something done by every student every day of his or her life. With the intrinsic relationship between proper nutrition and good health, it is vitally important that we help students to make intelligent decisions with regard to what they eat.

The ten packets which make up New Horizons in Nutrition can be taken together to form a comprehensive course in nutrition for secondary students. If you prefer, individual packets can be used when they're relevant to specific topics in health, home economics, science, or social studies classes. In addition, you can use the materials with entire classes or individual students can be given the packets for self-directed study.

Each packet contains a page of teaching suggestions which can easily be detached before the rest of the booklet is given to the students. The materials for the students include a pre-test, a selection which provides the students with factual information and examples of how this information can be utilized in everyday life, and a post test. Reading the selections and completing the evaluation devices is not enough to insure mastery of the concepts. We urge you to reinforce the packets by following through with related classroom activities. You'll find suggestions in the "Notes to the Teacher" or use them as a springboard to develop activities more ideally suited to the needs of your students. Finally, brief bibliographies are provided with each packet which lists related readings and audiovisual materials.

These suggested materials are not meant to be used as a research bibliography. Rather, they are sources of additional information which are likely to be of interest to secondary students.

The topics of the ten packets are:

1. *Advertising*
2. *Back to Basics*
3. *The Emotional Aspects of Nutrition*
4. *Food Faddism*
5. *Low Carbohydrate Diets*
6. *Nutrition and the Athlete*
7. *Nutrition: Yesterday, Today, and Tommorrow*
8. *Social Issues in Nutrition*
9. *Vegetarianism*
10. *Vitamin C and the Common Cold*

We sincerely hope these packets help you to make nutrition education an alive, relevant, and exciting topic of study for you and your students. The benefits for everyone are well worth your effort.

The Authors

TEACHING NOTES

INTRODUCTION

The most basic concept in nutrition education is that if one eats a varied, well-balanced diet it is likely that one's nutritional needs will be met. This is the main emphasis in this packet as well as basic information on the fat soluble vitamins.

OBJECTIVES

1. Students will review the Basic Four Food Groups.
2. Students will identify the functions and sources of the fat soluble vitamins.

ACTIVITIES

1. Students can obtain a copy of the new RDA's for 1980 and determine their RDA's of the major nutrients. Students can then record their food intake for 2-3 days. Using the nutrient content tables available through U.S.D.A., students can determine how their nutrient intake compares to the R.D.A.
2. Prepare a bulletin board illustrating the nutrient and caloric values for the student's favorite fast foods.
3. If possible, prepare snacks which are significant sources of calcium, iron, and vitamin A.
4. Collect labels from the student's favorite foods and check on their nutritional content by using the U.S. R.D.A.'s.

PRE TEST KEY

1. T
2. F
3. F
4. T
5. F
6. F
7. T
8. T
9. T
10. F

POST TEST KEY

1. F
2. T
3. F
4.
5.
6. answers to items 4 - 10 may vary.
7. See
8. packets for
9. more
10. information

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TEACHING NOTES CONT'D

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PRE TEST

1. _____ Calcium and vitamin D work together to build bones and teeth.

2. _____ Milk is a perfect food.

3. _____ Vitamin A is best known for its role in blood clotting.

4. _____ The fat soluble vitamins are A, D, E, and K.

5. _____ Fruits and vegetables are a good source of iron.

6. _____ A deficiency of vitamin E is very common.

7. _____ Generally all of the nutrients are interrelated in their effects on the body.

8. _____ The Recommended Daily Allowances are revised periodically.

9. _____ It is possible to take in toxic amounts of vitamin A and D.

10. _____ A deficiency of iron is known as scurvy.

SUPPLEMENTS

INTRODUCTION

Everyone talks about an adequate diet. Maybe you have been asked if you have a balanced diet. Do you know what that means? How can you tell if your diet is nutritionally adequate? There is so much discussion today about what nutrients are necessary for you. Everyday you read something new about nutrition and which nutrients are necessary. How can you tell if all of these stories are accurate?

BASIC FOUR FOOD GROUPS

I am sure that you have heard of the Basic Four Food Groups. Everyone has. But do you really understand these Basic Food Groups? These Groups were devised by nutritionists as a quick way of assessing the adequacy of a diet. If you receive each of the Four Food Groups in the recommended amounts every day, then you have a nutritionally adequate diet. But, you must have each one of the Groups. You cannot skip one group and double up on the others. Each group must be present daily.

The Four Food Groups are:

I. The Milk Group (8 ounce cups) 3 or more cups for children 9 to 12 yrs. 4 cups or more for teen ages.

Average Serving:

- 1 cup skim milk
- 1 cup buttermilk
- 1 cup low-fat milk
- 1 cup whole mile
- 1 cup reconstituted evaporated milk
- 1 cup cocoa or chocolate-flavored milk drink
- 1 cup malted milk
- 1 ounce cheese
- 1 1/3 cup cottage cheese
- 1 cup yogurt
- 1 ½ cup ice cream

The milk group supplies protein, calcium, phosphorus, riboflavin, vitamin A, and vitamin D.

II The Meat Group or the Protein Group (2 servings (5-6 ounces) per day for adults)

Average Serving:

- 2-3 ounces of fish or shellfish
- 2-3 ounces of poultry
- 2-3 ounces of cooked lean meat
- 2 eggs
- 2-3 ounces of cheese
- ½ cup cottage cheese
- 1 cup dried beans, peas, lentils
- ¾ cup of nuts
- 4 tablespoons of peanut butter

This group supplies protein, iron, thiamin, riboflavin, niacin, and fat.

III. The Fruit and Vegetable Group (4 servings per day)

Include:

a) One serving of a fruit or vegetable high in ascorbic acid or vitamin C every day.

b) One serving of a dark green or deep yellow vegetable for vitamin A every other day.

Average Serving:

1 cup raw salads
½ cup cooked fruit or vegetables
1 banana, 1 apple, etc.

Vitamin C Rich Foods

Citrus Fruits:
oranges or orange juice
grapefruit or juice
tangerines
lemons or juice

Other Fruits and Vegetables
cantaloupe
papaya
strawberries
tomatoes or juice
brussels sprouts
broccoli
green peppers

Vitamin A Rich Foods

Deep Yellow:
carrot
pumpkin
sweet potato
winter squash
cantaloupe
apricots

Dark Green:
collard greens
kale
mustard greens
spinach
turnip greens

This group supplies ascorbic acid, vitamin A, iron, and other minerals.

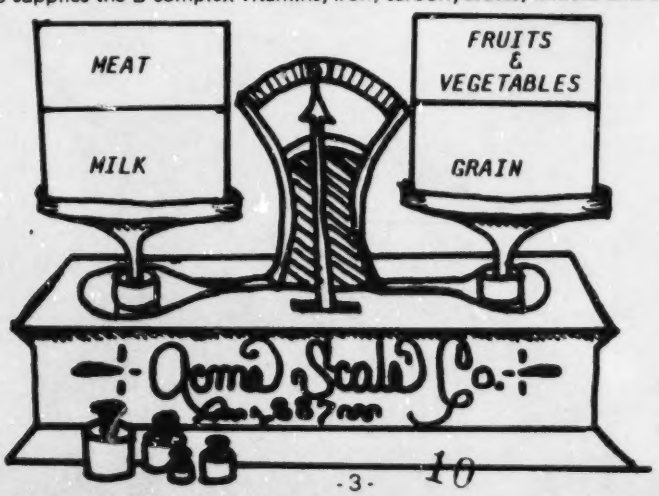
IV. The Bread-Cereal Group (4 servings per day)

All products should be made with whole grain or enriched flour.

Average Serving:

1 slice bread
½ to ¾ cup cooked cereal
1 roll, biscuit, muffin etc.
1 ounce ready-to-eat cereal
½ to ¾ cup cooked macaroni, spaghetti, noodles, or other pasta

This group supplies the B-complex vitamins, iron, carbohydrates, limited amounts of protein.



Why do we suggest the Four Groups? Because no single food can be considered perfect, that is it does not contain all food constituents in optimum amounts. A good example of this is the Milk Group. Milk is lacking in vitamin C and iron. If someone used milk exclusively, or if they substituted milk for the Meat Group and the Fruit-Vegetable Group, they would develop anemia and scurvy. Remember, milk is a valuable food, but it is only one of the four Groups. It cannot take the place of another group. The best guarantee of an adequate diet is to eat a variety of foods daily.

Each one of the groups will supply energy, and energy is the first requirement of the body. If we follow the Daily Food Guide and use the amounts recommended, then the kilocalorie level is sufficient for basal energy requirements. (Basal energy is the minimum amount of energy needed daily to maintain the vital life processes of the body.) To fully meet the energy needs, additional foods may be selected from the fats and sweets or from one or more of the food groups. The nutrient intake will remain at the level of the basic diet if sweets and fats provide the additional energy. However, it foods from one or more of the Four Food Groups are used to supply the extra energy, then the nutritive value of the diet will be substantially increased.

In addition to supplying energy, the Four Food Groups furnish the nutrients needed for the regulatory functions of the body. These nutrients, minerals and vitamins, aid in the release of energy within the body, and they help to regulate all body processes. There is a close relationship among all the nutrients, and each one works better when the others are present. The omission of any one nutrient can seriously affect the work of the others.

The foods are grouped into Four Major Devisions according to the common nutrients of each group. For example, the Milk Group is an excellent source of complete protein (protein that can build and repair tissue), calcium is for bone and tooth formation, and riboflavin is necessary for protein utilization and the release of energy within the body. All foods grouped under the heading of the Milk Group will supply these nutrients in similar amounts. The Meat Group supplies complete protein, iron (for hemoglobin), and thiamin (necessary for the release of energy within the body). All foods under this heading supply these nutrients. So it goes for each group (Refer back to the Basic Four Food Groups at the beginning of the packet).

RECOMMENDED DIETARY ALLOWANCES

Man has always been interested in food and the amount necessary to keep him physically fit. The

first national effort in the U.S. came about in 1940, when the Food and Nutrition Board of the National Research Council was orginated to guide the government in its wartime nutrition program. The Board carefully reviewed human requirements for the various nutrients. This led to the publication of the Recommended Dietary Allowances (RDA) in 1943. Since that time the RDA's are revised every 4-6 years to keep pace with our changing life style. The latest revision took place in 1980. They assume a "reference" man and woman weighing 70 and 58 kg, (approximately 154 pounds and 128 pounds) respectively, 23 to 50 years of age, and living in a temperate climate. Adjustments are made for age and body size. Additional modifications are required for changes in activity and climate.

USE OF THE RDA

The published allowances serve as a guide for planning and procuring food supplies for population groups, for interpreting food consumption records, for established standards for public assistance programs, for evaluating the adequacy of food supplies in meeting national nutritional needs; for developing nutrition education programs; for the development of new products by industry; and for establishing guidelines for nutritional labeling of foods.

INTEREST IN DIETARY SUPPLEMENTS

One of the common food falacies today is that you need a dietary supplement to have a nutritionally adequate diet. Followers of this belief claim that our soil is depleted of nutrients and it is impossible to get all of the essentials in the food we eat. This point of view is advocated by the media and reinforced through many publications.

Advertising frequently equates mother love with vitamin supplements. If you love your children you will give them the vitamins in the "chewable form". Some foods are supposed to increase intelligence, reproductive ability, strength, beauty, and vision. And these are qualities that we all want to enhance. Still other promotional campaigns promise quick help for individuals, such as the quick way to lose weight, the quick way to lower blood pressure, the quick way to increase energy. Some people fall for food faddism and self medication because they are dissatisfied with their medical care, and the supplement is the speedy way to good health.

There are as many appeals for the use of dietary supplements as there are individuals to persuade. But the most vulnerable group is the elderly. Most of the elderly are on fixed incomes and cannot afford to waste money on unnecessary supplements. For many of them, TV becomes the main link with

the outside world. The TV ads proclaim the numerous advantages of the use of supplements. And so they are persuaded to buy. One of the most serious dangers of this type of approach is that the elderly substitute these supplements for proper medical attention. Thus an easily treated condition may be complicated through lack of medical care.

A proper diet can be had if we get a variety of foods. If we follow the Basic Four Food Groups then we have a nutritionally adequate diet, and food supplements are not necessary. Remember that no one food supplies all the nutrients needed by the body. One important point to remember is that soil depletion of nutrients results in crop failure. Without the proper nourishment, plants cannot grow.

ROLE OF IRON IN THE DIET

One mineral element that does require careful inspection is iron (Fe). Iron combines with protein to form hemoglobin. Hemoglobin transports oxygen to the tissues, and carries carbon dioxide back to the lungs for excretion. Iron is supplied by the Meat Group and the Bread-Cereal Group. Two or more servings of the Meat Group, and four or more servings of the Bread-Cereal Group should supply the iron required by the body. Dried fruits are especially good sources of iron.

If iron is deficient in the diet, then anemia develops. The symptoms of anemia are a very pale color and complete lack of energy. The slightest activity can produce extreme tiredness. The body guards its supply of iron very carefully. It reuses the iron it removes from worn out blood cells. But it is not enough. The dietary source of iron is necessary to supplement the amount that is present in the body. Elimination of either the Meat Group or the Bread-Cereal Group can result in anemia.

FAT SOLUBLE VITAMINS

One of the most dangerous outgrowths of the overuse of dietary supplements is the toxicity of the fat soluble vitamins. Solubility of a nutrient means that it can dissolve in a given substance. There are four such vitamins, A, D, E, and K, and they are present in fat foods. These vitamins can be stored in the body. In other words, the excess is not excreted. It will build up in the body and it can reach dangerous toxic levels. Today this is a frequent occurence with vitamins A and D.

VITAMIN A TOXICITY

Since vitamin A can be stored in the liver, it can become toxic. The symptoms of vitamin A toxicity are: headache, drowsiness, nausea, dry skin and loss of hair, diarrhea in adults, scaly dermatitis, weight loss, anorexia and skeletal pain in infants. Recovery is rapid when vitamin A is discontinued.

The FDA is considering a ceiling of 10,000 IU of vitamin A that can be included in a multivitamin preparation without needing a prescription.

Carotene- the yellow pigment found in fruits and vegetables is a precursor or provitamin form of A. That means that carotene can be changed into vitamin A in the body. It is possible to get too much carotene. This can result in a change in the skin pigmentation. The skin develops a yellowish cast, especially on the soles of the feet and the palms of the hand. This is not serious, because it is not toxic. It looks worse than it is. Elimination of carotene will clear up the situation.

VITAMIN D TOXICITY

Vitamin D can also be stored in the body. This storage of D plus the fact that it is metabolized slowly produces toxic effects. The amount of vitamin D needed by infants is 400 IU. Amounts in excess of 3000 to 4000 IU of vitamin D in infants would be toxic. If this happens then there is an increase in the level of calcium in the blood, there is a loss of appetite, and growth is retarded.

Excessive amounts of D, such as 20,000 - 40,000 IU in infants or 75,000 - 100,000 IU in adults, produce the following symptom: sudden loss of appetite, nausea, vomiting, intense thirst, which causes polyurea (frequent urination), and diarrhea. Fatal cases have been reported. In these cases, there was calcification of the heart and lungs. This means that the heart and lungs began to harden with calcium deposits. The amount of vitamin D needed for this to take place is exceptionally high. But, it has happened because people take too many vitamin pills too often.

There are four fat soluble vitamins - A, D, E, and K. On the following page is a chart that summarizes these vitamins. Remember they are found in fat foods, that is why they are labeled fat soluble.

CALCIUM

Another mineral element that requires special attention is calcium. The best source of calcium is milk and milk products, such as hard cheese, ice cream and cottage cheese. In fact, it is almost impossible to meet the calcium requirement (1200 mg for teenagers) if milk is not used. In addition to milk, some calcium is found in turnip greens, collards, kale, mustard greens and broccoli. It is also found in oysters, shrimp, salmon and clams.

Calcium is important because it gives strength and rigidity to the bones and the teeth, and it functions in the contraction of muscles and the transmission of nerve impulses. Vitamin D is necessary for calcium absorption, and so is lactose (the sugar in milk). A deficiency of calcium can lead to: retarded

bone mineralization; fragile bones; stunted growth; rickets (see vitamin D); osteomalacia (softening of the bones occurs in adults-calcium is withdrawn from the bones and the bones become soft); and osteoporosis (decrease in the amount of bone present-occurs mainly in older people, especially older women). The Milk Group is essential for this nutrient.

FAT SOLUABLE VITAMINS

VITAMIN	FOOD SOURCES	FUNCTIONS	DEFICIENCY SIGNS	RDA
Vitamin A-Retinol	Fish-liver oils, liver, butter, cream, whole milk, whole-milk cheese, egg yolk, dark green leafy vegetables, yellow fruits and fortified margarines.	Necessary for the health of the mucuous membrane of the eyes, nose, mouth, etc. Necessary for dim light vision.	Night blindness, mucuous membranes become dry and hard. Eyes become infected and tear duct dries up. Permanent blindness may result.	Children: 2000 - 3300 IU Men: 5000 IU Women: 4000 IU Pregnancy: 5000 IU Lactation: 6000 IU
Vitamin D Cholecalciferol	Fish-liver oils, fortified milk, small amounts in butter, egg yolk, salmon, and sardines. sunshine	Regulates calcium and phosphorous absorption Regulates the deposition of calcium and phosphorous in the bones and teeth.	Rickets in children: soft, fragile bones, enlarged joints; bowed legs; chest, spinal, pelvic, and bone deformities; delayed dentition osteomalacia in adults of bones.	Need is small in adults Children, pregnant or lactating women 400 IU (softening
Vitamin E Tocopherol	Plant sources. vegetable oils; wheat germ, rice germ; green leafy vegetables; nuts; legumes.	Reduces oxidation of vitamin A, carotene, and polyunsaturated fatty acids.	Deficiency is not likely in humans. If it does occur: mild anemia and a breakdown of red blood cells.	Men: 15 IU Women: 12 IU Infants: 4-5 IU Pregnancy: 15 IU
Vitamin K Menaquinone	Green leaves such as alfalfa, spinach, cabbage, liver, some is synthesized in the intestines.	Necessary for the formation of prothrombin - this is required for blood clotting.	Prolonged clotting time. Hemmorrhagic disease in newborn infants.	Not known

NUTRIENT INTER-RELATIONSHIP

As we mentioned earlier in this packet, each nutrient works better when all the other nutrients are present. Just as you work better when you assemble all the essential materials for a project, so does the body. It will function more smoothly when all of the dietary essentials are assembled in the order that the body requires them. This will take place if we follow the Basic Four Food Groups in the recommended amounts.

Within this framework, we have some nutrients that have a special relationship with each other. Vitamin D is necessary for calcium absorption so vitamin D and calcium have a close relationship. Ascorbic acid or vitamin C is necessary for the absorption of iron, and it protects vitamin A from loss

through oxidation. Thus a lack of or a deficiency of one nutrient can inhibit the body from absorbing and utilizing another nutrient. These inter relationships are extremely important and must be observed if good nutrition is our goal.

SUMMARY

No one food supplies all of the nutrients we need. We must eat a variety of foods daily to receive a nutritionally adequate diet. It cannot be done with supplements. Supplements can be dangerous, because too much is just as harmful as too little. If a supplement is necessary, it should be prescribed by a physician or a dietitian, and it should be taken under guidance. You can achieve a nutritionally adequate diet daily. It is up to you!

QUESTIONS TO CONSIDER

Use the Basic Four Food Groups and the required number of servings to plan well-balanced menus for each of the persons described below.

1. An active eight-year old boy.

2. A fifteen year-old girl who want to lose ten pounds.

3. A seventeen year old football player.

4. A thirty-two year old working woman who must eat lunch in restaurants and at the same time watch her weight.

POST TEST

1. _____ The guidelines established through the Basic Food Groups only apply to children and teenagers.

2. _____ An insufficient intake of iron is one of the more common nutritional deficiencies.

3. _____ Adults do not need to be concerned with their intake of milk and cheese products.

Name at least two good food sources for each of the following nutrients:

Vitamin A

4.

5.

Iron

6.

7.

Calcium

8.

9.

Name one good food source of Vitamin D.

10.